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ited in the region, and, while one may not agree with all their conclusions, the paper will always have a value in connection with the question of several successive glaciations and of the formation of the loess. Their explanation of the cause of this driftless area is the same that has been advanced before,—a division of the continental ice-sheet by the high land to the north, and existence of lower channels to the right and left. This was supplemented by other influences the value of which it is difficult to estimate.

Professor Shaler's study of the phenomena exhibited by the sea-coast swamps of the eastern United States is also a valuable contribution to dynamical geology. The steps, as he traces them, in the formation of a salt-marsh are first, the deposit of mud by the currents in some sheltered spot, and next, the growth of eel-grass on the mud-flats thus formed. This in turn entangles still more mud, and soon the level is raised to where other plants can grow. This process is still further complicated by the formation of sand-beaches and sand-dunes, and of these two, or even more, may be formed in succession, broken here and there by openings for the drainage of the marsh behind.

Captain Dutton's paper on the "Geology of Mount Taylor and the Zuñi Plateau of New Mexico" gives the results of six years' studies in this region,—studies which are not easily reproduced in abstract, so strange is the region described. Here were found that peculiar type of volcanic action termed by Gilbert "laccolites;" dikes of volcanic material abundant around the edge of the plateau, but rare in its interior; carboniferous strata resting directly upon those of Cambrian age, and a series of mountain-peaks and necks not easily paralleled in other parts of the world, other than this strange western region which the past twenty years have shown to be so wonderful from every geological point of view.

Packard's Fossil Arthropods.¹—Dr. Packard has for some time been engaged in the study of fossil arthropods, and in these two memoirs gives us the results of his latest studies, the outlines of which have already been presented in the pages of the *NATURALIST*. The Syncarida, a proposed new group, is assigned a place intermediate between the decapods and tetradeapods. To the reviewer it would seem that the forms included are true Amphipoda, and that "Syncarida" can at most have but family rank. A wider knowledge of existing amphipods would have

¹ "On the Syncarida, a hitherto undescribed Synthetic Group of Extinct Fossil Crustacea;" "On the Gampsonychidæ, an undescribed Family of Fossil Schizopod Crustacea;" "On the Anthracaridæ, a Family of Carboniferous Macrurous Decapod Crustacea;" "On the Carboniferous Xiphosurous Fauna of North America." By A. S. Packard. Fifteenth and sixteenth memoirs of vol. iii. of the *Memoirs of the National Academy of Sciences*. 1887.

shown Dr. Packard that his definition and limitation of that group is extremely faulty. Dr. Packard's new family, Gampsonychidæ, is apparently valid, and belongs, where he has placed it, among the Schizopoda. In his paper on this group we observe that he regards his Syncarida as an ancestor of the schizopods. It is not easy to see how our knowledge of crustacean embryology supports such a view, for in development a schizopodal condition usually precedes the single-branched appendage. So far as the plates show, there is nothing except the telson to separate the family Anthracaridæ from the true Caridea, or to indicate that it differs from any existing group. The telson, however, is greatly different, approaching most closely in its appearance to that of the existing genus *Euceramus* of Stimpson.

The paper on the "Xiphosura of the Carboniferous" is the best of the series, containing as it does, in addition to the description of new forms, a *résumé* of our previous knowledge. It would seem, however, that the reference of *Cyclus americanus* to the genus *Cyclus* is hardly warranted. Except in the possession of a circular outline, *Cyclus* and the form in question have little in common. With regard to the other forms described or re-described by Dr. Packard, but little needs to be said. The relegation of Euproops into synonymy seems warranted, but the sub-order Synziphosuridæ, with its four new families, should have, at most, but family rank. For the Merostomata and Trilobites Dr. Packard proposes a class, Podostomata, the definition of which could be very seriously criticised. The most prominent point, however, to be mentioned is that Dr. Packard, in this new group, actually renames one of his own groups, which in turn was well enough named before. A slight variation in the limits of the Gigantostraca of Haeckel and Dohrn makes this group synonymous with the later Palæocarida of Packard, while, so far as we can see, Packard's Palæocarida and Podostomata are absolutely identical.

In closing this review, we may call attention to a tendency on the part of our author to rename things already well named, and his pages fairly bristle with "arthrosome," "bænopod," "urosome," "cephalula," and the like,—all synonymous with previously-coined and widely-used terms. The learning of this new nomenclature, in order to read intelligently one of Dr. Packard's later productions, is, as suggested by Col. Theodore Lyman in another connection, extremely like sawdust-swallowing,—neither palatable nor nutritious.

Thomas on Mammalian Dentition.¹—The reader who expects

¹ On the Homologies and Succession of the Teeth in the Dasyuridæ, with an attempt to trace the History of the Evolution of Mammalian Teeth in General. By Oldfield Thomas (British Museum). *Philos. Transac. Royal Society*, 1887, p. 443.